Mark Scheme (Results)

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Pearson BTEC Nationals
In Applied Human Biology
(21327L)
Unit 3: Human Biology and Health Issues

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Unit 3: Human Biology and Health Issues – sample marking grid

General marking guidance

- All learners must receive the same treatment. Examiners must mark the first learner in exactly the same way as they mark the last.
- Marking grids should be applied positively. Learners must be rewarded for what they have shown they can do rather than be penalised for omissions.
- Examiners should mark according to the marking grid, not according to their perception of where the grade boundaries may lie.
- All marks on the marking grid should be used appropriately.
- All the marks on the marking grid are designed to be awarded. Examiners should always award full marks if deserved. Examiners should also be prepared to award zero marks if a learner's response is not rewardable, according to the marking grid.
- Where judgement is required, a marking grid will provide the principles by which marks will be awarded.
- When examiners are in doubt regarding the application of the marking grid to a learner's response, a senior examiner should be consulted.

Specific marking guidance

- The marking grids have been designed to assess learner work holistically.
- Rows within the grids identify the assessment focus/outcome being targeted. When using a marking grid, the 'best fit' approach should be used.
- Examiners should first make a holistic judgement on which band most closely matches the learner response and place it within that band. Learners will be placed in the band that best describes their answer.
- The mark awarded within the band will be decided based on the quality of the answer in response to the assessment focus/outcome and will be modified according to how securely all bullet points are displayed at that band.
- Marks will be awarded towards the top or bottom of that band depending on how they have evidenced each of the descriptor bullet points.

Activity 1: Discuss how the article uses scientific information to present the CVD crisis and its dietary causes.

(12 marks)

Assessment focus	Band 0	Band 1	Band 2	Band 3	Band 4
Interpretation, analysis and evaluation of scientific information.	**0**	**1–3**	**4–6**	**7–9**	**10–12**
	Level of response not worthy of credit.	Generalised comments about how the health issue is presented, with limited attempt to consider any of the following: • how the article has interpreted and analysed the scientific information to support the conclusions/ judgements being made • the validity and reliability of data.	The presentation of the health issue is discussed, partially supported by a consideration of some of the following: • how the article has interpreted and analysed the scientific information to support the conclusions/ judgements being made • the validity and reliability of data.	The presentation of the health issue is discussed, mostly supported by a consideration of: • how the article has interpreted and analysed the scientific information to support the conclusions/ judgements being made • the validity and reliability of data.	The presentation of the health issue is discussed, consistently supported throughout by the consideration of: • how the article has interpreted and analysed the scientific information to support the conclusions/ judgements being made • the validity and reliability of data.
		Limited discussion that contains generic assertions rather than considering different aspects.	Displays a partially developed discussion that considers some different aspects.	Displays a developed discussion that considers different aspects.	Displays a well-developed and logical discussion that clearly considers a wide range of different aspects.

Indicative content

Learners:

- **May include other valid suggestions, not listed below, which should be credited.**
- **May cover a number of examples from the list below.**
- **Would NOT be expected to cover all points to get full marks.**

Interpretation and analysis

- Article does not mention other causes of CVD, including smoking, alcohol, obesity, lack of exercise, and (type 2) diabetes, or that age plays a part and that some people have a greater genetic predisposition to CVD.
- Article only focuses on fat and sugar, does not mention any other dietary factors that may be linked to CVD, such as lack of fresh fruits and vegetables (with their fibre, antioxidants and polyphenols).
- No mention of the role of the gut microbiota and the effects of a diet lacking in fibre/fruit/vegetables on its diversity and subsequently on appetite control, weight gain and ill health
- Article does mention failings in Dr Key's study (Figure 3) but does not explore problems with limited demographic (only males, only in age groups 55-59 and 45-49).
- Female (and child) physiology differs from that of males and therefore a male-only study is of very limited value to half or more of the population
- Similarly, there is a lack of criticism of Dr Yudkin's findings (Figure 4).
- Article implies causation between BNF recommendations and the fact some of their members work for or have worked for sugar companies but provides no evidence for this.
- The article does not provide any modern evidence regarding the links between CVD and diet – as now obesity and CVD are increasing in Japan, China, India
- Article does not make links between rise of sugar in processed foods and soft drinks, the consumption of which is enormous, and rise in obesity which is a major risk factor for diabetes type 2/metabolic syndrome/CVD
- No discussion of types of cholesterol – LDLs and HDLs
- Nothing about why we need some cholesterol – e.g. synthesising vitamin D and other steroid hormones, and cell membranes – especially in nerve cells/brain tissue

- The increase in prescriptions may be due to increased levels of diagnosis, or a decrease in mortality leading to increased morbidity rates needing ongoing treatment but this is a chronic disease and is therefore not curable, but treatable, and so prescriptions have to be issued long-term
- The article does not consider the possibility of the effects of genetic make-up of individuals and populations.
- Nothing at all about salt, which is a major cause of hypertension, which is a major risk factor for CVD, and is added to processed foods
- Nothing about omega-3 fatty acids, which are essential for good health
- Nothing about adverse effects of statins and why better to adopt healthy diet to prevent rather than rely on medication

Validity and reliability

- Article is well supported with references to NHS, BHF, WHO and respected scientific journals.
- News media cited may be slightly less reliable as their priority is selling units and attracting visitors to their sites, often by overstating the more sensationalist aspects of the crisis.
- With the amount of money involved in both the sugar and processed food and slimming diet industries, it is near impossible to guarantee that a source is entirely reliable.
- The graphs in Figure 3 and Figure 4 by themselves are by no means definitive. Are there any other factors that would produce a similar pattern when plotted against mortality? Income/socioeconomic? Inactivity? Obesity?

Activity 2: Discuss the key factors affecting the CVD crisis and its dietary causes.

(16 marks)

Assessment focus	Band 0	Band 1	Band 2	Band 3	Band 4
Understanding the key factors that affect the health issue	**0**	**1–4**	**5–8**	**9–12**	**13–16**
	Level of response not worthy of credit.	Demonstrates limited knowledge and understanding of the key factors affecting the health issue with generalised comments made.	Demonstrates adequate knowledge and understanding of the key factors affecting the health issue.	Demonstrates good knowledge and understanding of the key factors affecting the health issue.	Demonstrates comprehensive knowledge and understanding of the key factors affecting the health issue.
		Limited or no reference made to the article.	Attempts to use the article through the selection of some relevant aspects to support answer.	Sustained and logical connections made to the article through the selection of relevant aspects to support answer.	Sustained and comprehensive links made to the article through the selection of a wide range of relevant aspects to support answer.
		Limited discussion that contains generic assertions rather than considering different aspects.	Displays a partially developed discussion that considers some different aspects.	Displays a developed discussion that considers different aspects.	Displays a well-developed and logical discussion that clearly considers a wide range of different aspects.

Indicative content

Learners:

- **May include other valid suggestions, not listed below, which should be credited.**
- **May cover a number of examples from the list below.**
- **Would NOT be expected to cover all points to get full marks.**

Key factors

- The increase in cases of CVD and the disease's status as leading cause of death in the developed world.
- The resultant scientific drive to discover the causes behind atherosclerosis/CVD.
- The evidence supporting fat as the key dietary contributor to CVD.
- The criticism of the above evidence.
- The evidence supporting sugar as a second or possibly the leading key dietary contributor to CVD.
- Changes in agriculture/food manufacturing
- The bias of wealthy sugar-dependant industries in the crisis, including their relationship with:
    - scientific researchers
    - government policy
    - public perception.
- The change in prescribing may have moved the age of mortality, increasing the level of morbidity and thus increasing the demands on society and the perception of the crisis.

Reference to article

- Reference to statistics in the article
- Uses data from figures
- Summarises evidence from both sides
- Quotes studies
- Uses key terms that are explained in the glossary

Activity 3: Explain how different organisations/individuals influence the CVD crisis and its dietary causes. (10 marks)

Assessment focus	Band 0	Band 1	Band 2	Band 3
Understanding the influence of different organisations/ individuals.	**0**	**1–4**	**5–7**	**8–10**
	Level of response not worthy of credit.	Demonstrates isolated elements of knowledge of the influence of different organisations/individuals, on research and/or health issue, with major gaps or omissions.	Demonstrates mostly accurate knowledge and understanding of the influence of different organisations/individuals on research and health issues.	Demonstrates accurate and detailed knowledge and understanding of the influence of different organisations/individuals research and health issues.
		A basic explanation of how the organisation/individual may have an influence is given, but with general statements made and limited links to the article.	An explanation of how these organisations/individuals may influence the issue is given, occasionally supported through some linkage and application to the article.	An explanation of how these organisations/ individuals may influence the issue is given, supported throughout with linkage and application to the article.

Indicative content

Learners:

- **May include other valid suggestions, not listed below, which should be credited.**
- **May cover a number of examples from the list below.**
- **Would NOT be expected to cover all points to get full marks.**

Organisation	Influence of scientific issue
NHS	Public information Treating CVD Enormous cost required/resources stretched Also need for increased sized beds/operating beds/ambulances
UK government	Duty to provide for the wellbeing of its citizens Publishing of dietary guidelines Provide funding for research, organisations and media Increased tax on products containing processed sugars May put pressure on processed food industries to reduce their sugar, salt and fat content
National Advisory Committee on Nutritional Education	Working party created by the UK government Created dietary guidelines
The Lancet	Scientific journal Publish research Provides opinion

The Guardian	Newspaper, general public Informing public regarding developments in Nutritional Science

The British Nutrition Foundation	Registered charity Provides consultation on nutritional science to the UK government, schools and the food industry Political lobbyists
Food manufacturers	Vested interest in protecting sugar from links to health risks Provide funding for research, organisations and media Aggressive advertising campaigns to persuade more people/children to eat more processed high-sugar food Powerful corporations and their lobbying effect on governments/policy making Links to British Nutrition Foundation
University of London	Educational institute Funding studies Carrying out and publishing research
Tate & Lyle, British Sugar	Major sugar industries in the UK Vested interest in protecting sugar from links to health risks Provide funding for research, organisations and media Powerful corporations and their lobbying effect on governments/policy making Links to British Nutrition Foundation

The British Heart Foundation	Registered charity Funds research in heart disease Informs public of scientific advances and potential health risks

American Journal of Epidemiology	Scientific journal Publishes research Provides opinion
BBC/BBC Health	Media conglomerate Informs public of scientific advances and potential health risks General public
World Health Organisation	United Nations agency Provides guidance to governments, food industry and general public on health matters Funds research
Diet industry	Multi-billion pound industry Vested interest in protecting sugar, fat and salt from links to health risks Provide funding for research, organisations and media

Individuals	Influence of scientific issue
Dr Ancel Keys	PhD, qualified scientist Produced cherry-picked (hence unreliable) evidence supporting fat's role in development of CVD
Dr John Yudkin	PhD, qualified scientist. Produced evidence supporting sugar's role in development of CVD – his work largely ignored, until recently
Ritchie, H.	Author of 'What do the people of the world die from?' Discusses leading causes of death, worldwide
Scarborough, P., et al	Editors of "Trends in coronary heart disease" Details the rise in cases of CVD over the last few decades
Nordestgaard, B.	Author of "'Triglycerides and Cardiovascular Disease" Discusses links between sugar and CVD

Activity 4: Suggest potential areas for further development and/or research of the CVD crisis and its dietary causes.

(6 marks)

Assessment focus	Band 0	Band 1	Band 2	Band 3
Application of understanding to identify areas for further development and/or research	**0**	**1-2**	**3–4**	**5–6**
	Level of response not worthy of credit.	Demonstrates isolated elements of knowledge of the health issue.	Demonstrates mostly accurate knowledge and understanding of the health issue.	Demonstrates accurate and detailed knowledge and understanding of the health issue.
		Limited identification of areas for further development and/or research.	A description for further areas of development and/or research is given, occasionally supported through some linkage and application to the article.	A description for further areas of development and/or research is given, supported throughout with linkage and application to the article.

Indicative content

Learners:

- **May include other valid suggestions, not listed below, which should be credited.**
- **May cover a number of examples from the list below.**
- **Would NOT be expected to cover all points to get full marks.**

Further development:

- Further research into the mechanisms of CVD.
- More studies to cross reference conclusions.
- Expanding the scope of Key and Yudkin's studies to include a wider demographic
- Research needed on females and children – whose physiology differs from that of adult males
- Creating a more comprehensive study that encompasses more than fat or sugar intake.
- Investigation into conflicts of interest of consulting bodies/donors and scientific organisations.
- the use of morbidity as well as mortality statistics

Research:

- Researching other known factors that contribute to CVD.
- the interrelationships between dietary components and their effect on CVD rates
- Role of gut microbiota
- Role of salt
- How to better educate the public on this complex issue
- How to foster healthy eating habits (all efforts for last 30 years have failed)
- Importance of sleep as lack of sleep contributes to obesity and hence to CVD
- Effect of shift work – as leads to sleep disturbance and contributes to CVD
- Effect of watching screens before bedtime on sleep and hence on CVD
- Effect of 24/7 culture on sleep and hence CVD
- Effect of alcohol on CVD
- Effect of inactivity on CVD
- Protective effect of vitamin D
- How to encourage people to cook meals from scratch rather than use processed food
- How to reduce portion sizes in fast food outlets

Activity 5: A recent news headline said:

Fat was framed: Sugar is the real criminal behind the CVD Crisis

You have been asked to write an article for a health and lifestyle magazine about the importance of diet in reducing the risk of CVD.

When writing your article you must consider:

- **who is likely to read your article**
- **what you would like the reader to learn from your article.**

(16 marks)

Assessment focus	Band 0	Band 1	Band 2	Band 3	Band 4
Synthesises content ideas and demonstrates an understanding of scientific reporting.	**0**	**1–4**	**5–8**	**9–12**	**13–16**
	Level of response not worthy of credit.	Identifies some of the key information from the articles.	Summarises the key information and evidence from the articles.	Summarises and attempts to draw together key information using common elements from the articles.	Summarises and consistently draws together key information using common elements from the articles.
		Demonstrates limited understanding of audience or purpose.	Demonstrates some understanding of audience and purpose by some appropriate use of writing style and terminology.	Demonstrates good understanding of audience and purpose by using mostly appropriate writing style and terminology.	Demonstrates comprehensive understanding of audience and purpose by using appropriate writing style and terminology throughout.
		The response will be unstructured and limited to basic points made.	The response shows some structure and coherence.	The response shows a structure that is mostly clear, coherent and logical.	The response shows a well-developed structure that is clear, coherent and logical.

Learners:

- **May include other valid suggestions, not listed below, which should be credited.**
- **May cover a number of examples from the list below.**
- **Would NOT be expected to cover all points to get full marks.**

Indicative content

- An introduction to the CVD crisis with emphasis on the role of diet.
- An explanation that CVD is a chronic disease that cannot be cured, and its treatment costs the NHS a huge amount of money
- Other health problems often in tandem with it
- Therefore, far better to prevent – by adopting a healthy lifestyle (especially as NHS is in crisis/resources stretched to the limit)
- Familiarisation of the evidence against fat and the fat-free culture that has arisen over the last 30 years.
- Review of the evidence used to blame fat – ref to cherry-picking, and divert attention away from sugar
- review of how a low (saturated) fat diet can reduce the chance of developing CVD.
- Reference to the evidence linking sugar to CVD.
- Outline of how the sugar consumption has increased drastically since sugar became cheap and how obesity/CVD now more prevalent, especially amongst those of lower income
- Use of corn syrup in USA – fructose
- Addictive nature of sweet food and drinks
- Sugar in all processed foods – savoury as well as sweet
- Link between sugar and obesity and type 2 diabetes – both major risk factors for CVD
- Discussion about the possible flaws in this evidence.
- Reference to role of salt in hypertension
- Reference to increasing portion sizes contributing to obesity
- A conclusion that promotes a reduction in fat and sugar and salt for a healthy diet. And inclusion of more fruit and vegetables, less meat and more meals cooked from scratch
- The article should be targeted at members of the general public who may not understand more scientific terms and would respond to emotive language.